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| | **DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE**<br>**Question Bank**<br>**Course: B. Tech. Branch : Civil Engineering Semester : VIII**<br>**Subject Code & Name: BTCVSS802D (Soil Structure Interaction)** |
| | **Module 1** |
| **1.** | List out the different primary objectives of soil exploration. |
| **2.** | Enlist different soil exploration methods and explain any one in detail. |
| **3.** | Explain Geophysical exploration method to determine the Soil properties. |
| **4.** | Explain various methods to determine the shear strength of soil. |
| **5.** | Explain the design criterion of foundation is settlement. |
| **6.** | State different types of samples and samplers. |
| **7.** | State and explain different types of bearing capacities. |
| **8.** | Explain Terzaghi's Bearing capacity theory in detail with neat sketch. |
| **9.** | Explain the effect of water table on bearing capacity of soil. |
| **10.** | Explain Meyerhof's Bearing capacity analysis in detail with neat sketch. |
| | **Module 2** |
| **1.** | Explain the Settlement of clay or cohesive soil and that of granular or non-cohesive soil or sand. |
| **2.** | Explain the difference between immediate settlement and consolidation settlement. |
| **3.** | Explain the Plate load test in details with neat sketch. |
| **4.** | Explain bearing capacity measurement on granular soil based on SPT. |
| **5.** | Explain design criterion for shallow foundation. |
| **6.** | Explain Winkler's idealization method. |
| **7.** | Explain the idealization of the supporting soil medium and discuss the analysis of soil structure interaction. |
| **8.** | Explain the concept of modulus of sub-grade reaction. |
| **9.** | Explain any one of the following in details a) Hetenyi model. B) Pasternak model |
| **10.** | Discuss the concept of beam on elastic foundation. |
| | **Module 3** |
| **1.** | Discuss the concept of beam on elastic foundation. |
| **2.** | Solve one example on the beam with finite length subjected to a concentrated load. Assume the necessary data and mention it clearly. |
| **3.** | Discuss the expressions for deflection, slope, bending moment and shear force for a beam with finite length. |
| **4.** | State the classification of finite beams stiffness. |

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| **5.** | A beam with finite length, l = 3 m. The cross section of the beam is, 0.25 m × 0.2 m. A concentrated load of 22.2 kN is applied on the beam. The distance from A to the loading point is 'a' and that from B to the loading point is 'b'. Here, a = 0.75 m and b = 2.25 m. E value is $10.342 \times 10^6$ kN/m$^2$ and I value is $1.67 \times 10^{-4}$ m$^4$. |
| **6.** | Explain the continuity among the foundation soil layers. |
| **7.** | Discuss about the time-dependent response of the soil. |
| **8.** | Derive the expression for deflection, slope, bending moment and shear force for a beam. |
| **9.** | Analyze the infinite beam resting on soil subjected to a concentrated load of 200 kN. |
| **10.** | Analyze the beam infinite load resting on soil is subjected to a concentrated moment $M_0$ acting at centre. Find the deflection for this loading condition. |
| | **Module 4** |
| **1.** | Discuss the Poisson-Kirchhoff plate theory for thin plates. |
| **2.** | Explain the rectangular plate resting on the winkler spring |
| **3.** | Explain the circular plate resting on the winkler spring |
| **4.** | Discuss the use of finite difference method for soil structure interaction problems. |
| **5.** | Discuss the procedure to be followed to obtain the solution in case of a two parameter linear model. |
| **6.** | Discuss the procedure to be followed to obtain the solution in case of a two parameter non-linear model. |
| **7.** | Determining the solution for a finite beam resting on two parameter soil medium under plane strain condition. a) when slope at the centre is zero (x = 0) b) The shear force will be zero at the centre (x = 0) |
| **8.** | Determining the solution for a finite beam resting on two parameter soil medium under plane strain condition. a) The bending moment will be 0 at the edge where, x = b′. b) The shear force is also 0 at x = b′ (free end). |
| **9.** | Discuss the finite difference method in plate problem under axi-symmetric loading condition and then for non-dimensional case. |
| **10.** | Solve the case of a circular plate resting on Winkler springs by FDM. |
| | **Module 5** |
| **1.** | Discuss use of the Pasternak shear model to model an embankment. |
| **2.** | Explain the classification of piles based on a load criteria. |
| **3.** | Explain the concept of critical depth in case of pile foundation. |
| **4.** | Derive the expression of ultimate bearing capacity for end bearing pile. |
| **5.** | Derive the expression of ultimate bearing capacity for friction pile. |
| **6.** | Explain the elastic analysis of single pile. |
| **7.** | Discuss the settlement of pile group under compressive load by interaction factor approach. |
| **8.** | Explain Reese and Matlock's generalized solution for grouped piles. |
| **9.** | Discuss the settlement of pile group under lateral load by interaction factor approach. |
| **10.** | Explain the uplift capacity of piles and anchors. |